CLAIMS

1. A transgenic mouse comprising:

a first transgenic nucleotide sequence, integrated into the genome of said mouse, encoding human amyloid precursor protein (hAPP) operably linked to a first promoter; and

a second transgenic nucleotide sequence, integrated into the genome of said mouse, encoding human (h) α-synuclein operably linked to a second promoter;

wherein the first and second transgenic nucleotide sequences are expressed, and wherein, as a result of said expression, said transgenic mouse develops neurodegenerative disease.

2. The transgenic mouse of claim 1, wherein said first promoter comprises a platelet-derived growth factor β (PDGF-β) promoter.

3. The transgenic mouse of claim 2, wherein a simian virus (SV)40 derived intron operably links said PDGF-β promoter to said first transgenic nucleotide sequence.

4. The transgenic mouse of claim 1, wherein said first promoter comprises a Thy1 promoter.

5. The transgenic mouse of claim 1, wherein said first promoter comprises a

prion (PrP) promoter.

6. The transgenic mouse of claim 1, wherein said first promoter comprises a PDGF-β promoter.

7. The transgenic mouse of claim 6, wherein a SV40 derived intron operably links said PDGF-β promoter to said second transgenic nucleotide sequence.

8. The transgenic mouse of claim 1, wherein said second promoter comprises a Thy1 promoter.

9. The transgenic mouse of claim 1, wherein said second promoter comprises a PrP promoter.

10. The transgenic mouse of claim 1, wherein said second promoter comprises a PDGF-β promoter.

11. The transgenic mouse of claim 10, wherein a SV40 derived intron operably links said PDGF-β promoter to said second transgenic nucleotide sequence.

12. The transgenic mouse of claim 1, wherein proteins encoded by the first and second transgenic nucleotide sequences are overexpressed as compared to a

non-transgenic mouse of the same strain.

13. The transgenic mouse of claim 1, wherein the nucleotide sequence of hAPP comprises introns between exons 6 through 9 of hAPP.

14. The transgenic mouse of claim 1, wherein the nucleotide sequence encoding hAPP encodes hAPP770.

15. The transgenic mouse of claim 1, wherein the nucleotide sequence encoding hAPP encodes hAPP751.

16. The transgenic mouse of claim 1, wherein the nucleotide sequence encoding hAPP encodes hAPP695.

17. The transgenic mouse of claim 1, wherein the hAPP is a mutant hAPP.

18. The transgenic mouse of claim 17, wherein the nucleotide sequence encoding the mutant hAPP encodes a protein that contains a change from lysine to asparagine at amino acid 670 and a change from methionine to leucine at amino acid 671.

19. The transgenic mouse of claim 17, wherein the nucleotide sequence

encoding the mutant hAPP encodes a protein that contains a change from valine to isoleucine at amino acid 717.

20. The transgenic mouse of claim 17, wherein the nucleotide sequence encoding the mutant hAPP encodes a protein that contains a change from valine to phenylalanine at amino acid 717.

21. The transgenic mouse of claim 1, wherein the nucleotide sequence encoding hAPP encodes only a portion of hAPP.

22. The transgenic mouse of claim 21, wherein hAPP is $A\beta_{1-42}$.

23. The transgenic mouse of claim 1, wherein the nucleotide sequence of α-synuclein comprises a coding sequence of α-synuclein.

24. The transgenic mouse of claim 1, wherein the hα-synuclein is a mutant hα-synuclein.

25. The transgenic mouse of claim 24, wherein the nucleotide sequence encoding the mutant hα-synuclein encodes a protein that contains a change from alanine to proline at amino acid 30.

26. The transgenic mouse of claim 24, wherein the nucleotide sequence encoding the mutant hα-synuclein encodes a protein that contains a change from alanine to threonine at amino acid 53.

27. A transgenic mouse comprising:

a first transgenic nucleotide sequence, integrated into the genome of said mouse, encoding human amyloid precursor protein (hAPP) operably linked to a platelet derived growth factor β (PDGF-β) promotor operably linked to a simian virus (SV)40 intron;

a second transgenic nucleotide sequence, integrated into the genome of said mouse, encoding human (h) α-synuclein operably linked to a PDGF-β promoter operably linked to an SV40 intron;

wherein the first and second transgenic nucleotide sequences are expressed, and wherein, as a result of said expression, said transgenic mouse develops neurodegenerative disease.

28. The transgenic mouse of claim 27, wherein proteins encoded by the first and second transgenic nucleotide sequences are overexpressed as compared to a non-transgenic mouse of the same strain.

29. The transgenic mouse of claim 27, wherein the hAPP comprises a coding sequence containing introns between exons 6 through 9.

30. The transgenic mouse of claim 27, wherein the hAPP contains a mutation of valine to isoleucine at amino acid 717.

31. The transgenic mouse of claim 27, wherein hα-synuclein comprises the coding sequence of hα-synuclein.

32. The transgenic mouse of claim 27, wherein neurodegenerative disease comprises formation of intraneuronal inclusions characteristic of Lewy body disease.

33. The transgenic mouse of claim 27, wherein neurodegenerative disease comprises formation of fibrillary Lewy body-like inclusions.

34. The transgenic mouse of claim 27, wherein neurodegenerative disease comprises neuronal death.

35. The transgenic mouse of claim 27, wherein neurodegenerative disease comprises development of motor deficits.

36. The transgenic mouse of claim 27, wherein age of onset of neurodegenerative disease occurs at a significantly ($p < 0.05$) younger age than in singly transgenic littermates.

37. A method for screening therapeutic agents for the prevention or treatment of neurological disease comprising administration of therapeutic interventions to a transgenic mouse comprising:

a first transgenic nucleotide sequence, integrated into the genome of said mouse, encoding human amyloid precursor protein (hAPP) operably linked to a first promoter;

a second transgenic nucleotide sequence, integrated into the genome of said mouse, encoding human (h) α-synuclein operably linked to a second promoter;

wherein the first and second transgenic nucleotide sequences are expressed, and wherein, as a result of said expression, said transgenic mouse develops neurodegenerative disease.